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Slope unstabilities in U-shaped glacial valleys: Sunndalen and Romsdalen (western Norway).

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The two valleys under study are typically U-shaped glacial valleys of western Norway. A high density of past (mainly historical) rock falls and avalanches characterise the region with some 340 events recorded over an area of 90000 km2.

17 past events are along the 30 km long Romsdalen valley. 8 slope unstabilities are nowadays identified and 3 of them, namely Mannen, Svartinden and Flatmark, are presented herein according to their geomorphology, type of failure and involved volume. One rock fall occurred along the Romsdalen valley last autumn and a correlation with the other unstable sites is attempted. Both Flatmark and Mannen show columnar type failures at the edge of the high plateaus, at about 1000 m altitude. The columns show both downward movement and toppling process. At Flatmark, 4 blocks are nearly or fully detached from the scarp and range in volume from 0,2 to 1,4 Mm3. Mannen displays a large slope unstability of 9 Mm3 with, at the front, an active block of 1 Mm3. Svartinden is a large block of 5 Mm3 at the rear of a previous translational rockslide that has failed along a low-angle sliding plane. It can be considered as the unstable remnant of the previous rockslide. 8 past events are recorded along the 30 km long Sunndalen valley and 4 new unstabilities have been identified along the valley. The site called Gikling shows a very high density of open cracks trending perpendicular to the dip direction of the slope. No sliding plane has been clearly identified. However, series of water springs have been identified down the slope, 100 m below the top of the unstable mass, and may locate an eventual low-angle sliding plane. The whole destabilised volume is estimated in between 15 and 20 Mm3. At the site called Ottem, the failure propagates toward the west along an older scar . For the whole unstability several columns are mapped and display a total volume by 5 Mm3. The site at Gjøra

is juxtaposed to an older rockslide. Columns and slices are detached by large vertical open cracks and slid on foliation-parallel plane shallow-dipping towards the valley. The volume of the destabilised zone would be over 2,5 Mm3. The same geometry of slope failure is observed at the site called Litjdalen and the volume of the most unstable column may be about 1 Mm3.